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the book. The theory of interest is, in spite of all efforts at simplification, a difficult subject. It is important that it be expounded in every possible way and that a great many ingenious illustrations be used to make it clear. So long as it remains a well reasoned philosophy, we are not likely to have too many books on the subject, nor too many new methods of exposition tried out.

T. N. Carver.

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BARKER'S PUBLIC UTILITY RATES

Economists and engineers have been so absorbed with the question of the valuation of public utility properties, that they have failed to give to the problem of making specific rates (with the possible exception of railroad rates) the attention which it properly deserves. Therefore Barker's " Public Utility Rates "[1] is a welcome addition to the literature on public utilities, for it directs its attention primarily to the formulation of specific rate schedules for each of the various utilities.

The author presents a broad survey of the problem of rates for the various utility services, free from the obscuring details and variations which arise in individual cases. An " attempt has been made to keep the pages understandable to men not technically trained " — an attempt in which Mr. Barker has succeeded fairly well. In order to accomplish this purpose, those chapters which deal with the rates of a particular utility open with a review of its history, growth, and development, which is followed by a brief description of the technology of the industry. These sections are particularly valuable, because they present in brief compass those historical and technological facts which must be understood if rates are to be properly made. Then follows a description of typical rate schedules in operation in various places, together with the author's constructive suggestions as to the proper basis for rates for that utility.

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[1] Public Utility Rates, A Discussion of the Principles and Practice Underlying Charges for Water, Gas, Electricity, Communication and Transportation Services By Harry Barker, B S. New York, The McGraw-Hill Book Company, 1917

The first four chapters are given over to introductory material, some definitions of rates and services, and a consideration of various bases for rates. A public utility is defined as " a concern having special rights to use public property (like highways) and serving the general public " when its service " has become a necessity in the conduct of business and ordinary life of the many." Such utilities are divided into two classes: (1) those which store and handle a product, and (2) those which perform a service. In the first class are water and gas companies, and perhaps "eventually furnishers of domestic supplies like ice, coal, and milk." (It is difficult to reconcile this last statement with the previous definition, since such projects receive no special privilege from the public). In the second class are electricity-supply concerns, telegraph and telephone companies, steam and electric transportation lines, express companies, and the postal service. The author regards this grouping as an important one, in rate making. For the manufacturing plants of the first group of utilities may work under conditions of " maximum efficiency," that is, up to capacity, and continuously. But utilities in the second group must provide the service *when* it is being used. Therefore light and discontinuous operation of the plant is necessitated, requiring heavy fixed charges on idle investment. He holds that it is easier to test the reasonableness of rates of a utility making a storable product than of one performing a service. This may be true, but it is significant to note that more has been done in developing scientific theories of railroad and electrical rates than of water and gas rates.

In general, the author's position is, that in spite of other matters which may exert an important influence on rates, the prices charged should be studied in their relation to cost of service. Cost of service is regarded as the logical basis for the formulation of rates. A rate based upon cost may be accomplished by a two- or three-factor rate base, providing for the apportionment of fixed charges over customers in proportion to their possible demand, the assignment of operating charges in proportion to their consumption, and the distribution of customer charges equally. Or it may be accomplished by a grouping of customers. General experience, we are told, indicates that usually the business can be grouped into a few classes, wherein the maximum and minimum costs of unit service vary but slightly. The most satisfactory rate system is generally one which rests upon a classification of customers, giving to each a rate that would be "fair to the average customer of a class having wants similar to his." Under this plan, the two- or three-factor basis, while forming the foundation of rates, is expressed in simpler terms. The aggregate fixed charges, operating costs, and customer expenses required to serve a group are divided by the quantity of service taken by the group, and we obtain "a unit price which it is generally fair to impose on all the members of the group." Generally speaking, the author seems to prefer the latter method, on account of its greater simplicity to the mind of the consumer. Simplicity in the rate schedule he regards as usually more important than rigid adherence to individual rates, even though these might be wholly logical and completely accurate.

Chapters V to IX comprise a statement of the generally accepted principles of valuation, reasonable return, and depreciation. Chapter X, on railroad rates, is confined to a statement of the factors and problems involved in railroad rates and classifications — joint costs, value of the commodity, cost of service, risk, competition of water carriers, etc. Chapter XI, on express rates, describes the old express rate system, which prevailed up to 1914, together with the new rate system introduced by the Interstate Commerce Commission in that year. Both of the latter chapters are purely descriptive and make no contribution to the theories of railroad or express rate making. But they are valuable as statements, comprehensive in scope but brief in compass, of past and existing practices.

Chapter XII, on " Rate Problems of Street and Interurban Railway Transportation " describes the departures made in the United States from the flat five cent fare system, such as the Cleveland plan and the Milwaukee zone system. The cost of service principle, contrary to general assumption, is regarded as being applicable to street railway service. Mr. Barker proposes, first, a separation between fixed and operating costs. The total fixed costs would then be divided by the total number of passengers which the system is expected to carry without more equipment. This gives the minimum fare to be collected from every passenger, as a " readiness to serve " charge. There would also be collected from the passenger an additional amount, to cover operating costs, expressed as an average cost per passenger mile. This would represent the addition to the minimum fare to be collected for each unit of length — or zone — traveled. In view of the present rising costs of electric traction companies and the apparent necessity, in some cases, for increased revenues, the proposal to establish zone fares, based approximately upon cost of service, is at least worthy of serious consideration.

Chapter XIII deals with water rates. The problem is the distribution of costs between the city, chiefly for fire protection, and the various classes of private users. The author again adheres to the cost theory, maintaining that the city should pay for fire protection, in the form of " hydrant rentals " or otherwise, a return on the difference in the value of the plant as it exists and as it would be if no fire protection were given. This contention, obviously, rests upon the assumption that domestic water supply is the primary purpose of the system, and that fire protection is purely incidental, an assumption which in some cases may be open to challenge. The most equitable rate for private users is held to consist of (I) a minimum or service charge, sufficient to provide (*a*) a return upon the investment in service connection and meters, (*b*) the average cost of metering and billing, and (*c*) the average cost of unregistered water (found to be 27 per cent of the total output in 29 New England systems); (II) an additional unit price for water registered on the meter.

But, for simplicity, the service charge required from consumers may well be a minimum charge or guarantee, covering also the first block of water used Then additional water consumed would be charged for at a lower rate, since it would not be burdened with the service-expense items.

Chapter XIV, on gas rates, considers the schedules for both artificial and natural gas. Mr. Barker criticizes (and rightly) the requirements under which many gas companies are compelled to operate, which regulate the candle power of the gas, and urges the substitution of the heating-power test. He condemns the flat rate which still persists in many sections, and urges the substitution of the cost principle. This is to be accomplished by separation of costs into fixed, customer, and operating; the fixed and customer charges to be spread over the first one, two, or three thousand cubic feet consumed (depending on the size of the meter), followed by a much lower rate to cover operating costs for all excess consumption. Attention is called to the importance of the peak load in natural gas, as contrasted with artificial gas. In the former there are no manufacturing plants and holders, but the distributing plant must be ample for peak-load demands. Therefore, the rates should vary as markedly with hours of use, as in electric service.

Both the chapter on gas rates and on water rates are accompanied by tables showing comparative water and gas rates in American cities.

Chapter XV, on electric rates, indicates the multiplicity of special problems encountered in making electric rates, and holds that "a simple classification into size classes, with various unit prices for each, ordinarily is not sufficient to attain all the desired ends." It is to be regretted that the author, although he describes many different types of electric rate schedules, does not indicate with clearness the kind which he would favor. But apparently it is one which would recognize the consumer's demand or connected load, the time of use, and the amount of current consumed. However, rates for street and park lighting, it is held, may properly be flat rates, since the power requirements and hours of use can be accurately known in advance.

The concluding chapter on telephone rates calls attention to some of the peculiarities of the telephone industry as they affect costs. Among these are the rapid increase in unit telephone investment with the increase in the size of the exchange, and also the great increase in plant investment caused by peak loads. The author is somewhat skeptical of costs, as a basis for rates, in the telephone industry. He believes that here cost "can not be as reliable as a basis for rates, as the service costs which may be deduced for water, gas and electric utilities," and that the expenses of a telephone exchange can be directly allocated on the several classes of customers less readily than can be done in the case of most other (non-transportation) utilities. This is because of the complexities of the industry and the inter-class participation in the use of much of the equipment. Therefore he is inclined to look with favor upon the use, by the telephone industry, of a rate basis approaching " value of service," not in the sense of "all the traffic will bear " but rather as meaning the " total expense of a company apportioned over towns, cities and classes of subscribers in proportion to the *relative* worths of the services, and the *relative* abilities to pay."

The book contains much data difficult of access to the layman. Viewed as a compilation of information regarding the trend of public sentiment and the attitude of regulating bodies on rate making, and as a presentation of the most important economic and engineering problems in the establishment of rate schedules for the various utilities, it is an extremely valuable volume. On many rate matters, it does not say the final word. But it provides a careful discussion of those factors which call for judicious consideration in each individual case. It will contribute much towards making our rate regulation less haphazard in the future. Not all of its reasoning is unassailable, but diverging ideas are presented with fairness. The volume will meet a real need.

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